protherm

Panther

User manual

30 KTV v.19
25 KTV v.19
25 KOV v.19
25 (12) KTO v.19
25 (12) KOO v.19

- Wall-hang non-condensing boiler
- Power 10,4 - 29,6 (3,4 - 12,6) kW
- Flow heating HW
  (external HW tank)

EN version

CE

CONTENTS

STUDY THIS MANUAL CAREFULLY

1 Read me ... 3
- 1.1 Welcome ... 3
- 1.2 User's quick start manual ... 3

2 Commissioning the boiler ... 3
- 2.1 Description of the device ... 3
- 2.2 Commissioning the boiler ... 5
- 2.3 Shutting down the boiler ... 5

3 Manufacturer's documentation ... 5
- 3.1 Storing of documents ... 5
- 3.2 Explanation of symbols ... 6

4 Safety regulations ... 6
- 4.1 What to do if you smell gas? ... 6
- 4.2 Safety regulations ... 6

5 Warranty / Obligations ... 7
- 5.1 Warranty details ... 7
- 5.2 Using the device / Obligations of the manufacturer ... 7

6 Recycling ... 7

7 Packing list ... 8

HOW TO USE THE BOILER

8 Using the equipment ... 9
- 8.1 Overview ... 9
- 8.2 Turning on and off ... 9
- 8.3 User settings ... 9
- 8.4 Regulation of the boiler… ... 10
- 8.5 Boiler connection parameters ... 11
- 8.6 Connecting the boiler to the CH, HW and gas piping ... 12
- 8.7 Operating pressure in the heating circuit ... 13
- 8.8 Admitting water into the heating circuit ... 13
- 8.9 Discharging water from the boiler ... 13
- 8.10 Expansion tank ... 13
- 8.11 Safety valve ... 14
- 8.12 Hooking up gas ... 14
- 8.13 Operating sketch of 25 KOV ... 15
- 8.14 Operating sketch of 30 KTV and 25 KTV ... 16
- 8.15 Operating sketch of 25(12) KOO ... 17

CONTENTS

8.16 Operating sketch of 25(12) KTO 18
8.17 Air and exhaust lines 19
8.18 Connecting the boiler to the electricity supply 25
8.19 Boiler wiring diagram 27

NEED HELP?

9 Troubleshooting 28
10 Safety regulations 30
11 Servicing and maintenance of the boiler 30
11.1 Cleaning 30
11.2 Regular servicing 30
11.3 Replacement parts 30
12 Regulations 30
13 Converting to different fuel 31
14 Contact your sales service centre 31
15 Available system pressure 31
16 Technical parameters 32

STUDY THIS MANUAL CAREFULLY

1 Read me

1.1 Welcome

This manual is part of the equipment and following installation it must be provided to the user in compliance with valid regulations.

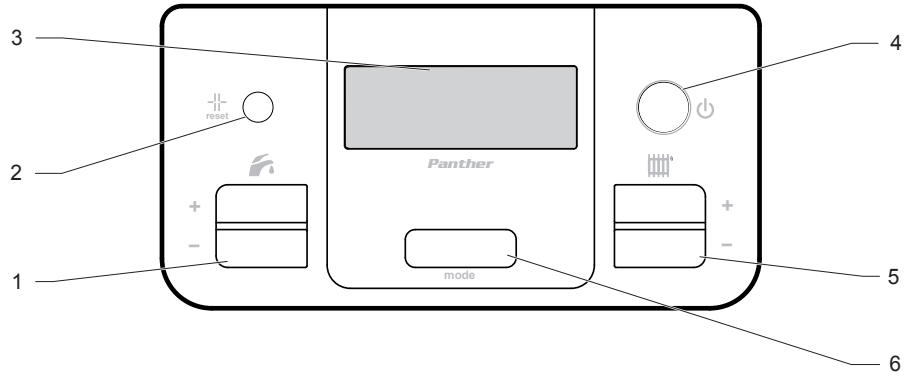
Study the handbook carefully to ensure a safe installation, safe use and proper service. We are not responsible for any damage resulting from failure to follow the instructions presented in this handbook.

1.2 User's quick start manual

We have prepared this User's manual to help you start to use your equipment right away.

It is assumed in this manual that the equipment has been installed and commissioned by a qualified technician.

Study closely the "Safety" and "Warranty" chapters, which contain important safety information.



1 Keys for setting the HW temperature
2 RESET key
3 Display
4 Main switch
5 Keys for setting the CH temperature
6 MODE key

2 Commissioning the boiler

2.1 Description of the device

PANTHER boilers are compatible with the usual types of hot water circuits and radiators.

A network of service providers who meet the mentioned requirements work under contract to the manufacturer to commission the boilers and to provide warranty and after-warranty service.

The boiler (as well as all its optional accessories) complies with the requirements of European Directive 90/396/EEC on gas-fuelled appliances and European Directive 92/42/EEC on efficiency, the European Directive 2006/95/EC on electrical means of operation for use in certain voltage ranges and the European Directive 89/336/EEC on electromagnetic compatibility.

The appliance is also approved according to the European norms EN 677, EN 625, EN 60335-01, EN 50165, EN 55014, EN 61000-3-2 and EN 61000-3-3.

In order to operate and handle the boiler in accordance with the purpose for which it is designed in actual conditions of use (hereafter referred to only as use), it is necessary to abide also by additional conditions – the most essential of which (i.e. those which must not be omitted) are found in the following regulatory documents:

- in the design area: STN 06 0310 and STN 06 0830;

- in the fire safety area: STN 92 0300;

- for installation and fitting (and repairs): STN EN 1755 or STN 38 6460, as applicable STN 38 6462, Decree no. 48/1982 Coll. (as amended by the later prescriptions) and the binding occupational health regulations;

- in time of running and operation: STN 38 6405;

- in the area of discharge of combustion gases and air inflow STN EN 483, company material – “catalogue of dual piping for discharge of combustion gases and inflow of combustion air designated for type C gas appliances, i.e. in closed “TURBO” version.

The boiler is designated for operation within the normal AA5/AB5 environment in compliance with STN 33 2000-3 and STN 33 2000-5-51 (i.e. a temperature range of 5 – 40°C, temperature-dependent humidity to a max. of 85%).

PANTHER boilers are suitable for the conditions of zones 1, 2 and 3, in rooms with a bath or shower and in washing areas as set out in STN 33 2000-7-701; they may not be installed in zone 0 (Fig.8). Before installation in the areas mentioned, protection against electric shocks must be provided for according to the same norms.

The boiler complies with Ministry of Health Decree No 13/1977 Coll., i.e. on noise, for installation in residential and public areas.

The boilers are built to operate with heating water, in compliance with STN 07 7401. (Above all, the water must never be acidic, i.e. its pH must be higher than 7 and it should have minimal carbonate hardness.)

The requirements regarding the characteristics of domestic water are set out in STN 83 0616 (potable water STN 75 7111). With regards to water with total material concentrations of calcium and magnesium greater than 1.8 mmol/l, further “non-chemical“ measures against scale deposits (e.g. operation of magnetic water treatments in combination with settling equipment) are advisable.

Silting up of the boiler with contaminants from the heating system or the settling of boiler scale on these disturbances, or on induced disturbances (e.g. silting up of the exchanger, pump breakdowns) are not covered by the boiler warranty.

The distance from flammable materials (e.g. PVC, fibreboard, polyurethane, synthetic fibres, rubber etc.) must be

sufficient to keep the surface temperature of these materials below 80°C.

The minimum working (unhindered) space in close proximity to the boiler must be such that the boiler can be worked with easily and safely with bare hands and with the usual hand tools; we recommend a minimum distance of 300 mm from up and under, 10 mm from side and a minimum of 600 mm in front of the boiler.

- CH (heating) + HW (hot water)

The PANTHER boiler (models KTV and KOV) supplies both central heating and hot water for the home or only for central heating (models KTO and KOO).

- Non-condensing boiler with exhaust vented to a chimney

Models KOV and KOO must be fitted to a ventilation system (chimney). The boiler comes equipped with a safety device that shuts off the gas feed if the chimney becomes blocked.

- Non-condensing boiler with forced extraction of exhaust.

The KTV and KTO models are gas models fitted with a ventilation system for the intake of air and the venting of exhaust. Thanks to this ventilation system, the heater can be installed in any space.

If the ventilator fails or if the chimney becomes blocked, the pressure switch shuts down the heater.

The boiler must be installed and commissioned by a qualified technician. This ensures proper installation and operation in compliance with valid norms. If any maintenance, repair or adjustments concerning the gas are needed, a qualified technician must be called.

PROTHERM has developed tailor-made accessories that will help you use your heater with maximum efficiency.

2.2 Commissioning the boiler

Installation of the boiler and its first start-up must be carried out by authorised service personnel only!

If you wish to start the boiler after it has been commissioned, ensure that:

- It is hooked up to the electricity supply
- All the shut-offs and valves (CH, HW, gas) under the boiler are open
- The CH pressure is within the recommended range of 1 – 2 bar.

2.3 Shutting down the boiler

Turn off the master switch.

If the boiler is to be shut down for an extended time, close all the valves (CH, HW, gas) underneath it. The shut-down must take into account the water temperature in the boiler and the outside temperature in the given season. If there is a danger of frost, drain all water from the boiler, the heating system and the hot water piping (see the paragraph 8.9 on page 12).

3 Manufacturer's documentation

3.1 Storing of documents

- This manual must be stored near the equipment to allow it to be accessed when needed. If you should move house, you must leave this manual near the device in order to allow the new owners to find it.
- To ensure safe and efficient use of your boiler, study the instructions and observe them carefully.

We bear no responsibility for damages resulting from failure to observe the instructions.

3.2 Explanation of symbols

DANGER: Risk of injury.

DANGER: Risk of electric shock.

CAUTION: Risk of damage to the equipment or its edge parts.

IMPORTANT: Useful information.

4 Safety regulations

4.1 What to do if you smell gas?

If you smell gas:

- Do not search for the leak with an open flame.
- Do not turn on any electrical switches, telephones or any other devices that could spark an explosion.
- Immediately open all windows and doors to ventilate the area.
- Shut off the flow of gas at the safety valve.
- Alert all other persons in the building.
- Call from outside from your house the emergency assistance services of your gas supplier.

4.2 Safety regulations

The following regulations and safety instructions must be observed:

- Never tamper with the safety devices.
- Do not modify the equipment or its immediate surroundings, as this could affect the safe use of the boiler.
- Do not under any circumstances destroy or remove the sealing from any of the parts.
- Never carry out alone any maintenance or repairs to the equipment. Only qualified technicians may work with the equipment.
- Be careful not to allow children to play with the boiler.
- Do not plug or obstruct the ventilation system.

Some home “improvements” may significantly affect the functioning of the boiler. Before carrying out any such intervention you must consult with the installer.

- Do not site the equipment in excessive dampness.
- Do not use and do not store explosive or flammable materials (e.g. gasoline/ petrol, aerosols, thinners, chlorine-based cleaning agents, paints, glues etc.) in the same space as the boiler. Under certain conditions these materials may be corrosive.
- Do not touch the equipment surfaces - e.g. the ventilation pipes, hydraulic connectors and so on — even after the boiler has been turned off, as these surfaces may be hot. Touching these surfaces may lead to burns or scalding.

- Be prudent when using the hot water tap. Water coming out of this tap may be scalding.

This equipment contains metal parts (components). In working with it and in cleaning it, particularly its corners, you must be careful.

- If water leaks from the unit you must immediately turn off the cold water intake and the leak must be repaired by a qualified technician.
- Do not store any objects on top of the equipment.

5 Warranty / Obligations

5.1 Warranty details

PROTHERM's Panther boiler is covered by warranty as set out by the Warranty, Service log and other conditions listed in the service and installation manuals.

5.2 Using the device / Obligations of the manufacturer

The above-specified warranty is valid if:

- The equipment was installed by a qualified technician in accordance with the installation guidelines.
- The equipment is used for domestic purposes and in compliance with the operation and maintenance instructions of the manufacturer.
- All servicing, maintenance, repairs, dismantling of or working with the equipment during the warranty period is carried out by a qualified technician only.
- Repairs or replacement of parts during the warranty period do not extend that period.

The manufacturer bears no responsibility whatsoever for any damages resulting from:

- Any type of damage arising from incorrect or incomplete installation, inadequate servicing or incorrect hook up of gas or water.
- Any type of damage to a system to which the equipment is connected.
- Any type of damage caused by incorrect protection against freezing.
- Any type of damage or faulty set-up caused by changes of character or pressure of gas or water or changes in electric voltage.
- For further information please study the Conditions.

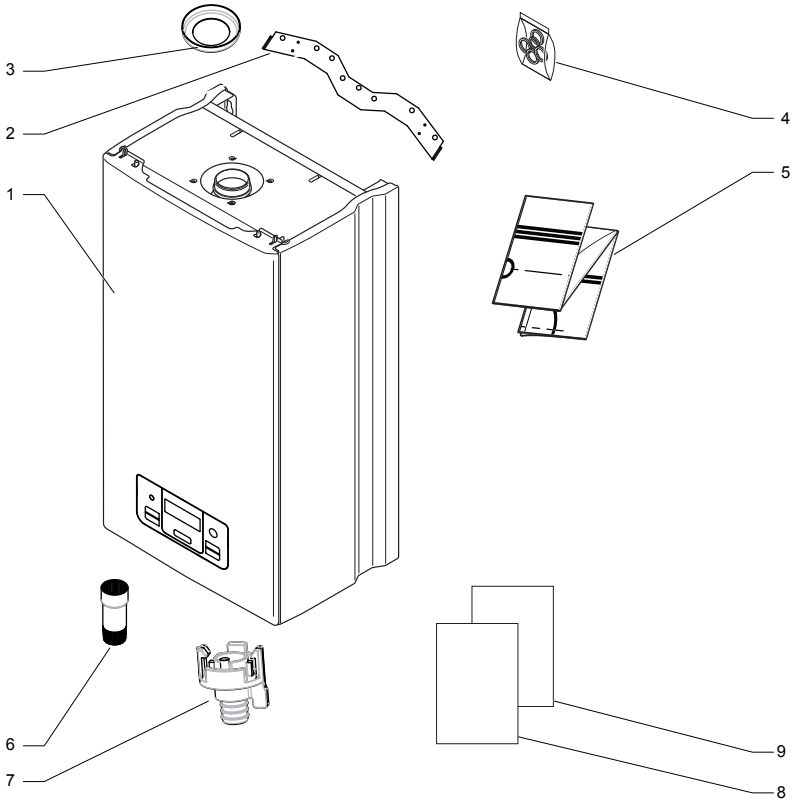
This equipment may be installed only in countries listed in the descriptive plaque.

6 Recycling

Most of the boiler is comprised of recyclable materials.

The equipment packaging must be properly recycled.

7 Packing list



Legend

1 Boiler
2 Draw bar
3* Exhaust gas diffuser (only for 12 KTO)
4 Sealing
5 Template
6 Butt-end of water intake
7 Butt-end of outlet valve
8 Service manual
9 Warranty

* Exhaust gas diffuser is mounted in boiler for 25 and 30 kW.

HOW TO USE THE BOILER

8 Using the equipment

8.1 Overview

8.2 Turning on and off

The boiler is turned on and off at the main switch, which is located on the control panel of the boiler.

8.2.1 Display icons

When you turn on the boiler, the display shows the current status of the boiler:

- if the boiler is not lit (do not heat HW eighter CH) - so called ˝stand-by˝ mode, the display shows the current water pressure in the heating system, the current CH temperature and set HW temperature with the symbols (tap at HW and radiator at CH)
- during the CH heating radiator symbol flashes, on the screen is displayed current CH temperature and real-time pressure in the system
- during the HW heating screen in the upper right corner displays the flame symbol and flashes tap symbol, on the screen shows real-time pressure in the system, current CH temperature and set HW temperature
- if pressure drop in the system below 0,5 bar starts flashing on the display symbol for the lack of water in the system (crossed drop) together with the current value of pressure. In this case it is necessary to add pressure in the system, committing water. If the system pressure reaches 0,5 bar pressure stops flashing and also the symbol for a small amount of water in the system is not displayed.
- if pressure increase above the value of 2,4 bar screen begins to flash the current value of the pressure. In this case it is necessary to reduce water pressure in the heating system, water withdrawal from the system. If the system pressure falls below 2,4 bar, the display again shows the current status of the boiler.

8.3 User settings

8.3.1 Choice of heating mode

The PANTHER boiler can work in various modes:

- Heating mode - press the MODE key once. The display will portray the real-time pressure in the system and the real-time CH temperature along with the radiator icon. The HW temperature setting is not displayed. In this mode the boiler heats only CH water; HW heating is locked out.
- SUMMER mode - press the MODE key twice. The display will portray the HW temperature setting together with the water tap icon and the real-time pressure in the system. The real-time CH temperature is not displayed. In this mode, the boiler responds only to requests for hot water; the central heating is locked out.
- VACATION mode - press the MODE key three times. The display will show only the real-time pressure in the system. The real-time CH temperature and HW temperature setting together with the corresponding icons are not displayed. In this mode, both hot water and the central heating are locked out. All the protective functions of the boiler are active.

8.3.2 Setting the hot water temperature

Press the (+) or (-) key, and the HW value will begin to flash. Pressing the (+) or (-) keys sets the desired HW temperature anywhere in the range of 38 - 60°C, at one-degree increments.

8.3.3 Setting the temperature of the central heating water

Press the (+) or (-) key, followed by the MODE key, and the CH value will begin to flash. Pressing the (+) or (-) keys sets the desired CH temperature anywhere in the range of 38 - 80°C, also at one-degree increments.

8.4 Regulation of the boiler

8.4.1 Operating the boiler without a room regulator

In this mode the boiler will maintain the chosen CH temperature. A room regulator is not connected; connection terminals have to be interconnected (supplied by the manufacturer).

Set-up:

- Press the main On/Off switch
- Set the desired CH temperature on the control panel

8.4.2 Operating the boiler with a room regulator

If a room regulator is used, the CH temperature must be restricted at the boiler control panel to the maximum recommended for your heating system (to avoid damage to your system), and which can also cover the thermal losses of the property at low outside temperatures. Heating of the central heating water can then be managed by the regulator, which will permit only that maximum CH temperature you have set at the control panel.

Note: In spaces with a regulator there should be no thermostatic valves on the radiators.

Caution: The manufacturer assumes no responsibility for damages resulting from faulty setting of the boiler or room regulator.

8.4.3 On/OFF regulator

The boiler will maintain the selected CH temperature. Boiler operation is interrupted (turned on and off) according to the internal temperature in the room in which the room regulator is located.

8.4.4 Regulator with output modulation function selected

The room regulator continuously regulates the boiler output into the heating circuit based on the indoors temperature.

8.4.5 Boiler operation with isothermal regulation

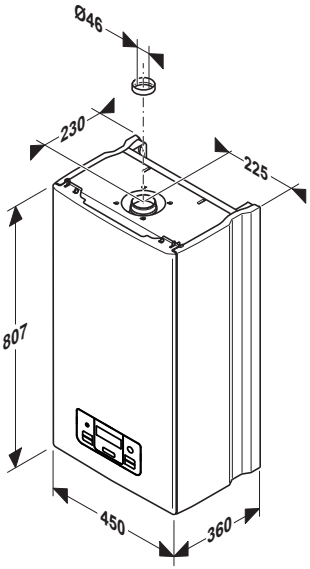
The boiler regulates the CH temperature based on changes in the outside temperature. For this type of regulation it is necessary to use a regulator with an isothermal regulation function (Protherm Thermolink B, Thermolink P or Thermolink RC) and to connect it to the outside temperature sensor.

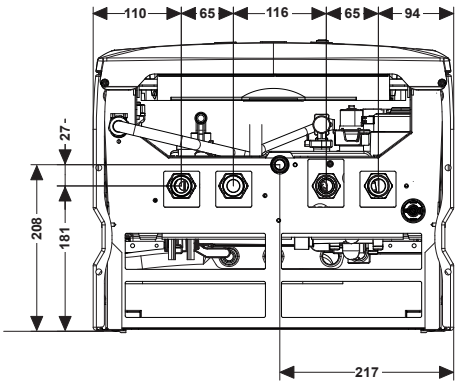
Caution: Setting the maximum CH water temperature on the boiler control panel may influence the isothermal regulation. The CH water temperature selected at the boiler control panel is also the limiting temperature; The room regulator setting cannot override the heat limit temperature set at the boiler control panel. Setting an appropriate CH water temperature at the boiler control panel is one way to guard against exceeding the maximum allowed temperatures into the heating system (floor heating). Despite this, we recommend placing into the heating system a supplementary safety armature that will guard against a harmful increase in temperature.

Caution: The room regulator and external sensor may be connected by authorized service personnel only.

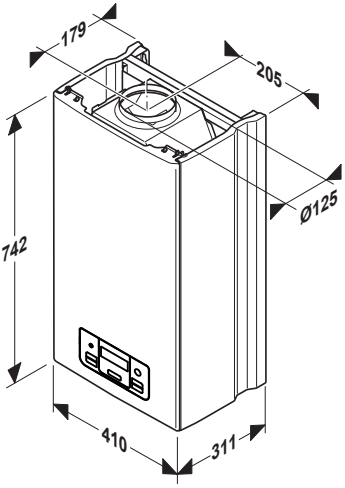
8.5 Boiler connection parameters

8.5.1 Panther 30 KTV

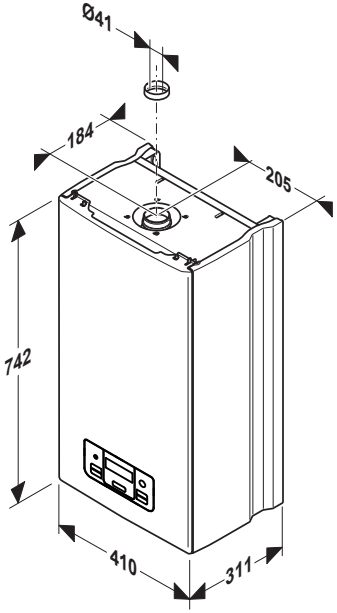


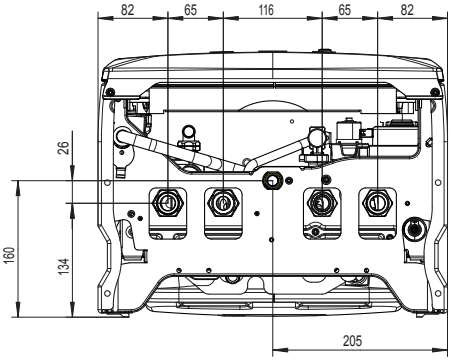


8.5.2 Panther 25 (12) KOO, 25 KOV

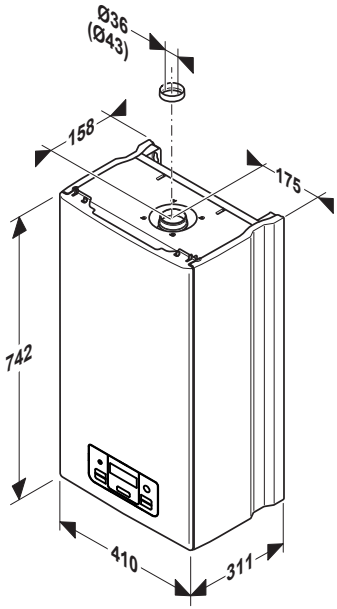


8.5.3 Panther 25 KTV, 25 KTO





8.5.4 Panther 12 KTO



8.6 Connecting the boiler to the CH, HW and gas piping

The boiler connection terminals may not be placed under undue pressure from the piping system for the CH circuit, the HW circuit or from the gas intake. This assumes a precise observance of the dimensions of the endings of all connecting pipes, with regard to height as well as distance from walls and separation distances of the interconnected individual intakes and outlets.

The heating system circuit should be connected to the boiler in such a way that during repairs to the boiler the heating water need be released only from the boiler.

During reconstructions, in adverse building arrangements and so on, the boiler may be connected to the CH heating system, the HW system and the gas inlet with flexible elements (hoses), but only those designated for this purpose. If flexible elements are used, these should be as short as possible and must be protected from mechanical and chemical stresses and damages. It must also be ensured that before the end of their life cycle or reliability in maintaining their parameters (according to their manufacturers' data) they are always replaced by new ones.

Note: The boiler includes filter which is situated below the HW flow sensor. You have to take out the HW flow sensor with filter to clean up the filter.

8.7 Operating pressure in the heating circuit

The heating system (measured at the boiler) must be filled to a hydraulic pressure of at least 1 bar (corresponding to a hydrostatic height of water of 10 m.) The recommended pressure range is between 1 - 2 bar.

8.8 Admitting water into the heating circuit

Bringing water into the heating system (small quantities only) can be done via the inlet valve on the boiler.

When filling the boiler the following conditions must be observed:

- The water pressure on entry into the boiler must always be higher than the water pressure in the CH circuit.
- Water is drawn into the boiler strictly in a cold state (CH temperature in the boiler up to 30°C).
- The recommended water pressure in the cold boiler (up to 30°C) is between 1 – 2 bar.
- The pressure in the expansion tank is checked and if necessary adjusted to the correct value (see technical parameters on end of this manual).

8.9 Discharging water from the boiler

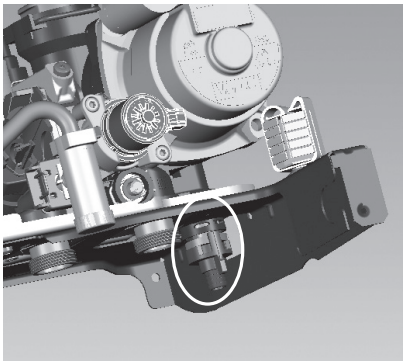
The outlet valve is designated primarily for lowering the water pressure in the boiler during repairs. Only a partial discharge of water from the boiler is possible through this outlet.

A complete draining of water from only the boiler or the heating circuit and repeat filling must be carried out at inlet/outlet valves at appropriate locations in the heating circuit.

Discharging and filling of water into the heating circuit and the subsequent operations (air venting, regulating the expansion tank) are not covered by the boiler warranty.

If the HW in the boiler and piping is threatened with freezing, appropriate measures must be taken to avoid this entirely.

Note: The release valve is located on the right side of the boiler at the pump.



8.10 Expansion vessel

Before filling the CH system, check the pressure in the expansion chamber. The initial pressure in the expansion chamber should be greater by 0.2 bar than the static height of the water column of the heating circuit.

Water may then be released into the CH system. Filling water pressure should be 0,2 – 0,3 bar higher than the pressure in the expansion chamber. Filling pressure is controlled from the cold state by the gauge on the water side after bleeding.

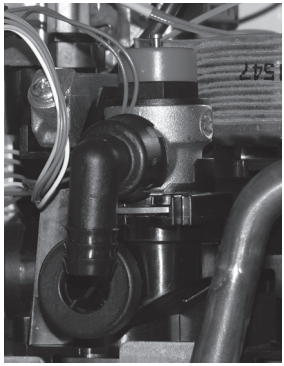
The valve for topping up the pressure in the expansion chamber is on the right side.

Caution: Confirm that the expansion chamber is sufficient for the given quantity

of water in the CH circuit (see the project installation documentation).

8.11 Safety valve

The safety valve is located the underside of the boiler on the left of the hydraulic block. Draining from the safety valve may lead (if the maximum pressure in the system is exceeded) to the outflow of water or the escape of steam. For overflow that may emerge through the safety valve, it is therefore recommended to install a bleeder that feeds into the sewerage system of the property.



Caution: Do not under any circumstances manipulate the safety valve during the operation of the boiler. The safety valve furthermore may not be used for releasing water from the boiler or the heating system. The settling in the valve of detritus from the heating system is not covered by the warranty.

8.12 Hooking up gas

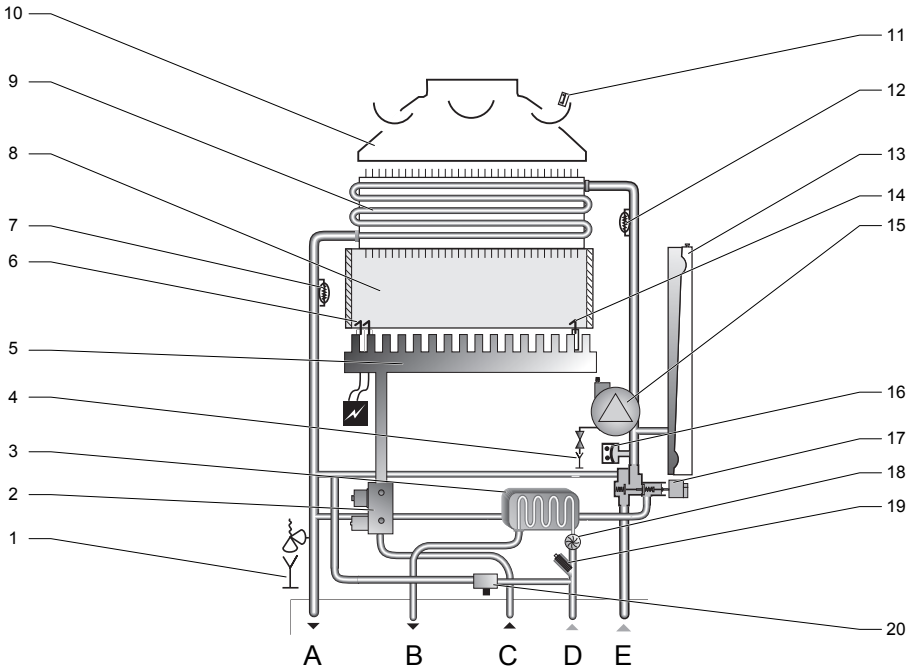
The PANTHER version of the boiler is designated for operation with natural gas with a rated pressure in the piping system of 2 kPa, for which a heating value from 9 to 10 kWh/m3 is most often specified. The dimensions of the internal gas distribution piping and gas meter must be adequate to handle the other gas appliances of the user.

Gas lines in buildings must be installed in compliance with STN EN 1775.

Caution: It is recommended that the gas inlet into the boiler be tightened by fastening a union nut on the top face of the socket through the corresponding sealing (see the Packing list).

After completing the installation of the gas piping into the boiler the gas-tightness of the completed connection must be checked thoroughly.

8.13 Operating sketch of 25 KOV

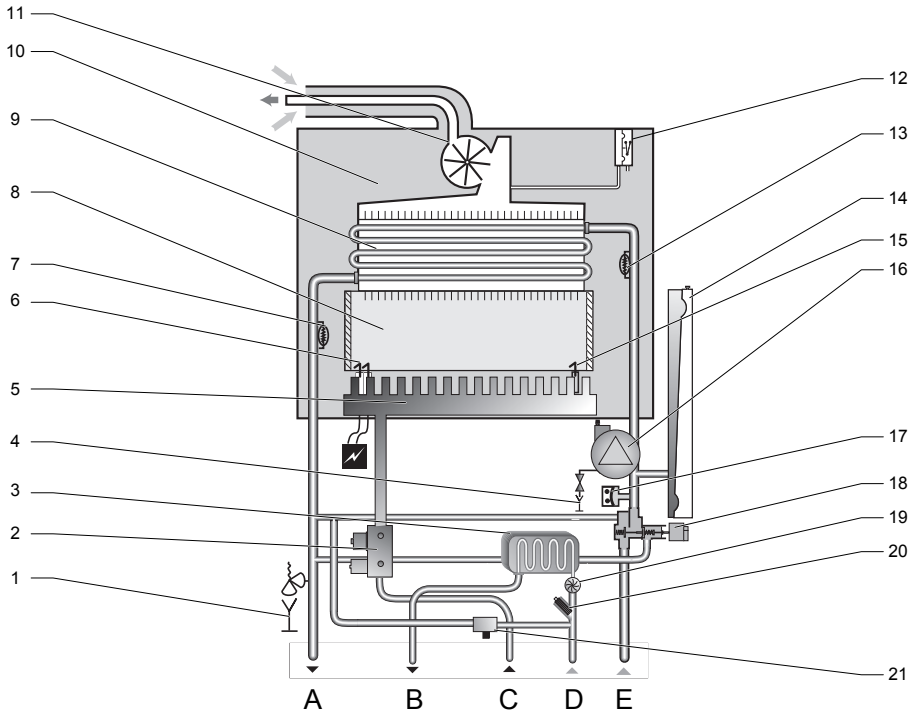


Legend

1 Safety valve
2 Gas valve
3 HW exchanger
4 Discharge valve
5 Burner
6 Ignition electrodes
7 NTC CH water intake temperature sensor
8 Combustion chamber
9 CH exchanger
10 Exhaust gas collector
11 Combustion thermostat
12 NTC CH return water temperature sensor
13 Expansion tank
14 Ionising electrode
15 Pump
16 CH pressure sensor
17 3–way motor valve
18 HW flow sensor
19 HW filter
20 Inlet valve

A CH outlet
B HW outlet
C Gas inlet
D HW inlet
E CH inlet

8.14 Operating sketch of 30 KTV and 25 KTV

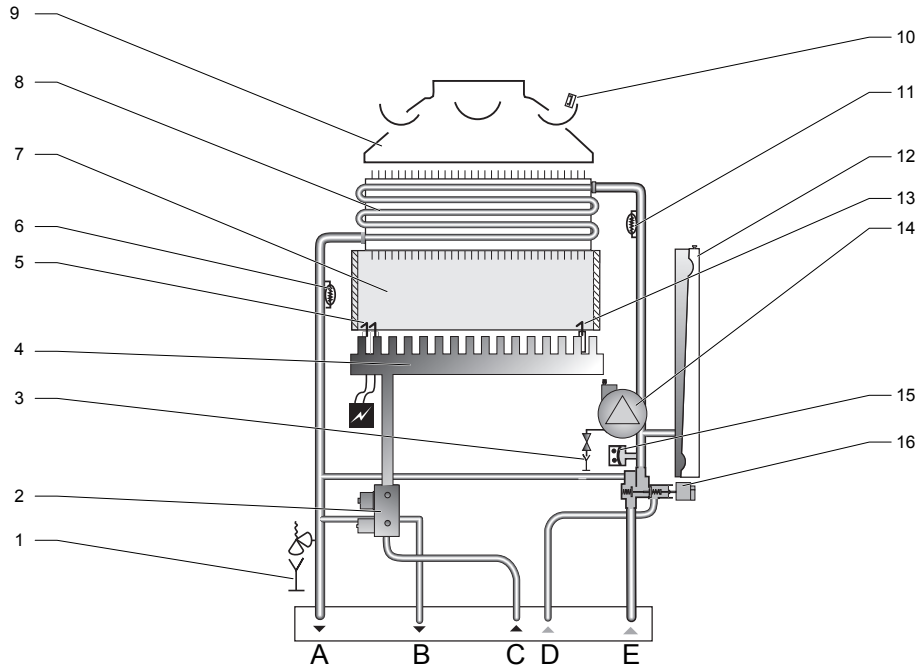


Legend

1 Safety valve
2 Gas valve
3 HW exchanger
4 Discharge valve
5 Burner
6 Ignition electrodes
7 NTC CH water intake temperature sensor
8 Combustion chamber
9 CH exchanger
10 Exhaust gas collector
11 Ventilator
12 Air manostat
13 NTC CH return water temperature sensor
14 Expansion tank
15 Ionising electrode
16 Pump
17 CH pressure sensor
18 3–way motor valve
19 HW flow sensor
20 HW filter
21 Inlet valve

A CH outlet
B HW outlet
C Gas inlet
D HW inlet
E CH inlet

8.15 Operating sketch of 25 (12) KOO

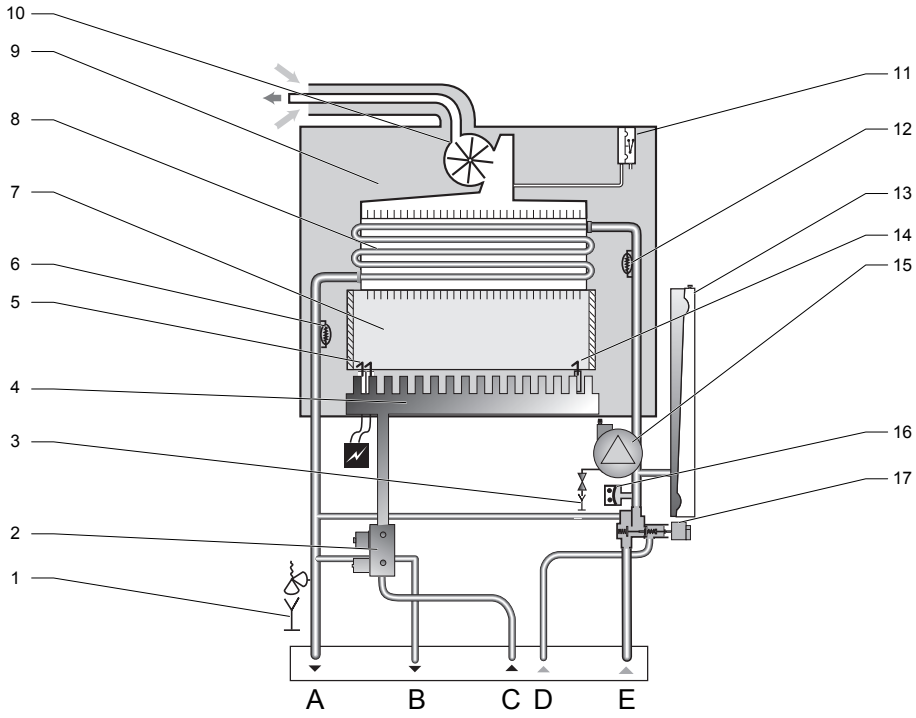


Legend

1 Safety valve
2 Gas valve
3 Discharge valve
4 Burner
5 Ignition electrodes
6 NTC CH water intake temperature sensor
7 Combustion chamber
8 CH exchanger
9 Exhaust gas collector
10 Combustion thermostat
11 NTC CH return water temperature sensor
12 Expansion tank
13 Ionising electrode
14 Pump
15 CH pressure sensor
16 3–way motor valve

A CH outlet
B HW outlet
C Gas inlet
D HW inlet
E CH inlet

8.16 Operating sketch of 25 (12) KTO



Legend

1 Safety valve
2 Gas valve
3 Discharge valve
4 Burner
5 Ignition electrodes
6 NTC CH water intake temperature sensor
7 Combustion chamber
8 CH exchanger
9 Exhaust gas collector
10 Ventilator
11 Air manostat
12 NTC CH return water temperature sensor
13 Expansion tank
14 Ionising electrode
15 Pump
16 CH pressure sensor
17 3–way motor valve

A CH outlet
B HW outlet
C Gas inlet
D HW inlet
E CH inlet

8.17 Air and exhaust lines

The type KOV and KOO is designed for combustion gases to be removed and discharged into a chimney (through a chimney inlet) with a minimum stabilised thrust of 2 Pa. The boiler is connected to the chimney inlet by a flue of a diameter corresponding to the size of the boiler's gas exhaust outlet. It is forbidden to place inside the combustion gases exhaust ducting any objects which impair the combustion gases flow (e.g. various types of heat exchangers to utilise their residual heat). The combustion gases exhaust ducting is not part of the boiler accessories.

Construction of the combustion gases exhaust ducting as well as that of the chimney must comply with relevant requirements. Compliance with the requirements specified by these standards will prevent undesirable phenomena from occurring, such as excessive cooling of the combustion gases, penetration of dampness into brickwork and fluctuations in the chimney thrust, and thus prevent undesirable effects on the boiler's functioning.

The boiler takes combustion air from the space in which it is installed. Air must be supplied in sufficient quantity in accordance with applicable regulations.

Venting of exhaust and drawing in of combustion air for the KTV and KTO type is done only through designated pipes.

The level sections of the piping slope at a gradient sufficient to let the condensation drain towards an outside area or towards a receptacle designed to draw off condensation. To achieve this, the elbow joint may be gently bent away from the straight section. The upright sections of the piping are always fitted with devices to draw off condensate. The devices for drawing off the condensate are installed where possible close to the passage where the exhaust exits the boiler. Breakdowns caused by leaking condensate are not covered by the boiler warranty.

8.17.1 Methods of air and flue gas ducting (according to STN EN 483) and permitted piping lengths

If not described otherwise for the individual following methods of placing coaxial pipe routes and their drainages, the piping lengths (from connection at the boiler to the drainage) can be set as in the following cases.

Note: Each time an extra 90°elbow is needed (or 2 at 45°), the length (L) must be reduced by 1m.

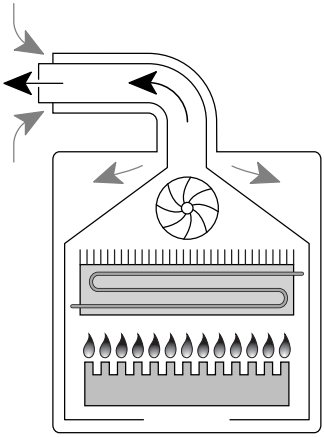
Caution: If the lengths described for individual types are exceeded, the exhaust diffuser (orifice) must be removed from the ventilator drain.

The following methods of air intake and exhaust venting are recommended for the boiler:

8.17.2 The C_{12} method (KTV, KTO)

Level routes and level venting into an open area.

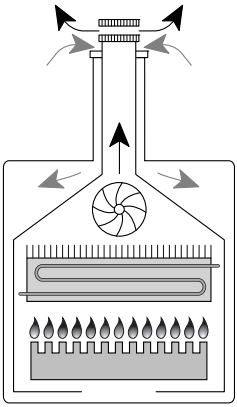
An example of a level coaxial pipe route: version C_{12} (complies with STN EN 483)



8.17.3 The C_{32} method (KTV, KTO)

Vertical routes and vertical venting into an open space.

An example of a vertical coaxial pipe route: version C_{32} (complies with STN EN 483)

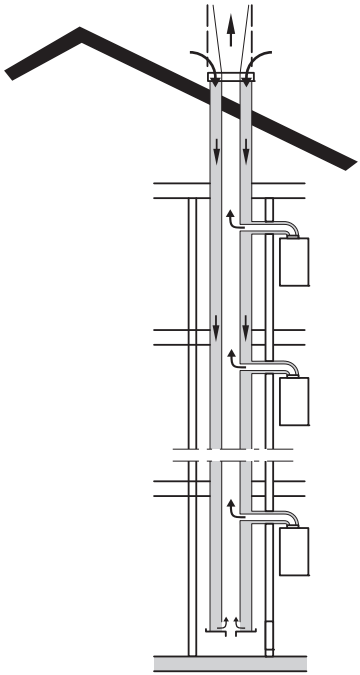


8.17.4 The C_{42} method (KTV, KTO)

Connecting to a double shared chimney.

Double piping from independent boilers (independent routes) can feed into shared chimneys; the transport capacity of the chimney is judged according to the manufacturer's data on the chimney. If the pipes are set into the chimney in two directions and vertically aligned, there must be a vertical separation between the outlets of at least 0.45 m. Where two outlets vent towards each other, they must be separated by a minimum vertical distance of 0.6 m. The exhaust piping into the shared double chimney never has terminal elements — the same as with pipes that vent into open areas!

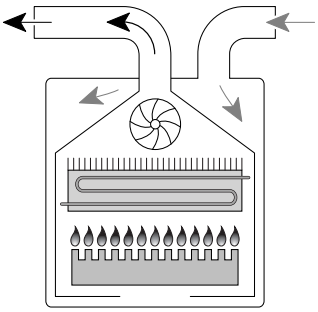
Both components of the route — external (air) and internal (exhaust gas) — must safely feed into the relevant chimney duct but not protrude so deeply that they create blockages in the exhaust or air ducts.



8.17.5 The C_{52} method (KTV, KTO)

Separate double piping and venting into different areas (with different parameters, mainly of pressure)

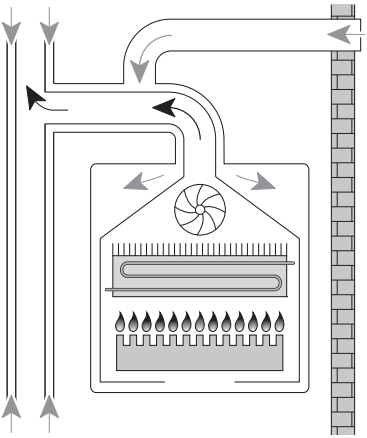
For venting exhaust and bringing in air for combustion, separate piping may be used. The separate piping may not be routed on opposing walls of the building.



Attention! Any duct crossing a wall that exceeds the ambient temperature by more than 60 °C must be thermally insulated at the site of this crossing. The insulation can be carried out using an appropriate insulating material with a thickness ≥ 10 mm and a thermal conductivity ≤ 0,04 W/m.K.

8.17.6 The C_{82} method (KTV, KTO)

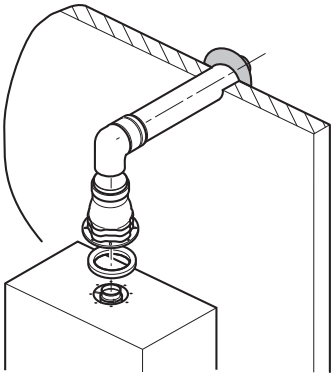
Using piping in cases where the air is drawn in from an open area and the exhaust vents into a shared chimney.



Air may in the same way be brought in from an open space (or a space well supplied with air) and exhaust extracted into a common chimney (or, again, into a space with common venting of exhaust gases). The special case of B_{22} also belongs in this category. (See following text.)

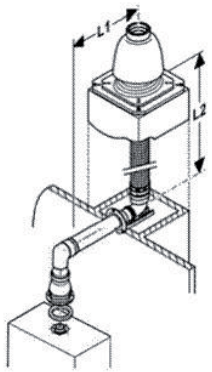
8.17.7 The B_{22} method (25 KTV, 25 KTO)

Extraction of exhaust (also in separate piping) into an open area and intake of combustion air from an internal space in the building in close proximity to the boiler (in coaxial piping with the perforation of its outer part).



When drawing in air for combustion from internal areas of the building, a sufficient quantity of that air must be ensured. No other appliance may be connected to the exhaust duct (whether chimney or pipe), and when drawing in air at least 1.2 m3 of air/hour per kW of boiler output must be available.

8.17.8 The B_{22p} method (only for 30KTV)



8.17.9 Piping gradient

The layout of the piping must permit a down-gradient of the exhaust piping towards the boiler at a nominal gradient of 3 percent. A device for drawing off condensate must be placed on the piping as close as possible to the boiler.

8.17.10 Lengths of fumes

Boiler	Method	Fume diameter	Diffuser diameter	MIN	MAX	Comment
12 KTO	C12 / C42	60/100	36	0.5	3	with elbow 90°
			43	4	9	with elbow 90°
	C32	80/125	36	1	3	no elbow
			43	4	12	no elbow
	C52	80+80	36	1+1	3+3	with elbow 90°
			43	4+4	9+9	with elbow 90°
	C82	80+80	36	1+1	3+3	with elbow 90°
			43	4+4	9+9	with elbow 90°
30 KTV	C12 / C42	60/100	46		0.3	with elbow 90°
			-	0.3	3.5	with elbow 90°
	C32	60/100	-	1	4	no elbow
		80/125	-	1	8	no elbow
	C52	80+80	-	0.5+0.5	15+15	with elbow 90°
	C82	80+80	-	0.5+0.5	15+15	with elbow 90°
	B22p	80	-	0.5	15	with elbow 90°

Boiler	Method	Fume diameter	Diffuser diameter	MIN	MAX	Comment
25 KTV / 25 KTO	C12	60/100	-	0.3	3.5	with elbow 90°
			41		0.5	with elbow 90°
		80/125	-	0.5	11	with elbow 90°
			41		1	with elbow 90°
	C32	60/100	-	1	4.5	no elbow
			41		1.5	no elbow
		80/125	-	3	12	no elbow
			41		3	no elbow
	C42	60/100	-	0.3	3.5	with elbow 90°
			41		0.5	with elbow 90°
	C52	80+80	-	0.5+0.5	15+15	with elbow 90°
			41		2+2	with elbow 90°
	C82	80+80	-	0.5+0.5	15+15	with elbow 90°
			41		2+2	with elbow 90°
	B22	80	-		2	with elbow 90°

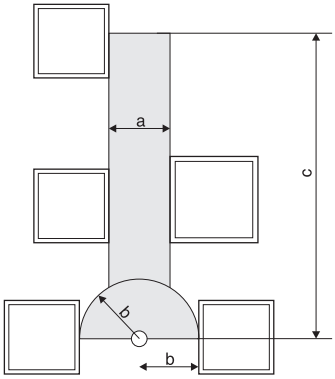
Note: Each additional 90° elbow dicrease the total length about 1m. Each additional 45° elbow dicrease the total length about 0,5m.

8.17.11 Examples of flue duct placements according to Appendix No 7 of the Government Regulations of the SR No 92/1996 Coll.

- Independent apertures in a flat wall

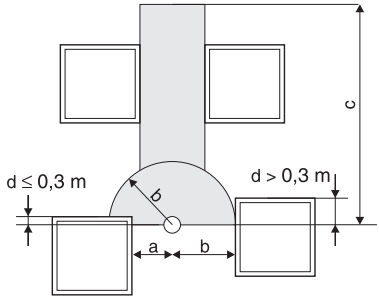
Independent aperture creates a zone from the axis of the aperture of a width a = 0.5 m, radius b = 1.0 m and height c = 5.0 m.

Sketch of the zone created by an independent aperture of an exhaust stack



If the axis of the aperture is at a distance d > 0.3 m below the upper part of the window frame, the zone may not extend to the window surface. At distances d ≤ 0.3 m, the protective zone of radius b may extend to the upper part of the window.

Sketch of the zone from the axis of the aperture of the exhaust stack sited close to the upper part of the window



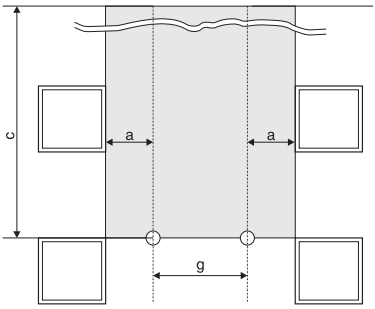
- Dual apertures set level in a flat exterior wall

Distances of dual apertures set level with each other in a flat wall are:

a = 1.5 m; g = 5.0 m; c = 5.0 m.

If g < 5 m, an intersection zone occurs, making it necessary to maintain the total 8 m width of the zone and also increase the “a» values proportionally on both sides (e.g., if g = 4.0 m, then a = 2.0 m).

Dual apertures set level in a flat exterior wall



- Dual apertures set vertically

The minimum distances for double apertures set vertically in a flat exterior wall are:

a = 0.5 m; b = 1.0 m; c = 5.0 m, a1 depending on x as follows:

x ≥ 5.0 m, then a1 = 0.5 m,

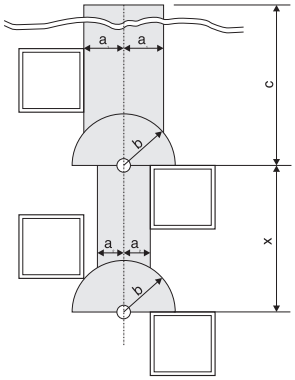
x ≥ 4.0 m, then a1 = 0.6 m,

x ≥ 3.0 m, then a1 = 0.75 m,

x ≥ 2.0 m, then a1 = 1.0 m,

x ≥ 1.0 m, then a1 = 1.2 m,

Dual apertures set vertically in a flat exterior wall



Important warning!

The examples cited for placing exhaust ducts can be used only in repairs or reconstructions of properties.

Other cases must be approached as set forth in Decree No 410/2003 of the Slovak Ministry of the Environment, which amends and supplements Decree MoE SR No 706/2002 Coll. on Air pollution sources, on Emission limits, on Technical requirements and general operating conditions, on the List of toxic substances, on the Classification of air pollution sources and on Requirements for ensuring the dispersion of hazardous substances.

8.17.12 Safety measures

The distance of flammable materials from the exhaust component of the separate piping must be enough to ensure that the temperature at the surface of these materials is no higher than 80°C.

Exhaust may not be vented in areas:

- where a danger of explosion is present (as set forth in STN 33 2320)
- that are interior areas of a building (lofts, halls, stairwells etc.)
- closeable, i.e. passages or gateways etc.
- that descend underground (even if these remain open to the surroundings and free of obstructions), e.g. tunnels, underpasses etc.

These basic injunctions for venting exhaust must always take adequate account of where independent air intakes are sited.

Wall apertures for coaxial piping for drawing in air and venting exhaust are cut to the appropriate size (approx. 120 to 150 mm) and sealed (with building construction methods) following the installation. Non-flammable materials (with Degree A of flammability according to STN 73 0823) must be used for sealing, e.g., masonry mortar, plaster etc. Openings in combustible walls or roofs must be made according to the first section of this part.

8.18 Connecting the boiler to the electricity supply

Hooking up the boiler to the mains voltage is done through a triple-wire plug with a flexible cord. The socket for connecting the boiler to the electrical network must comply with STN 33 2000-4-46. It must always have the protective ground (pin) reliably connected with the PE or PEN wire (a combination of green and yellow colours). The boiler must always be connected through its main to the ground and must always be installed in a way that allows access to the socket and plug. The use of a variety of “adaptors”, “extension cords” etc. is not permitted.

Caution: The preparation of plugs and sockets as well as room regulator connections that extend into the interior electrical components of the boiler must under all circumstances be carried only by a person with electrotechnical qualifications as set forth in Decree No. 50/1978 Coll. In the same way, servicing of the electrotechnical components may be carried out only by a person with the above-mentioned professional qualifications. Before servicing the electrotechnical elements the boiler must be disconnected from the current by pulling the mains lead from the socket!

The main body of the boiler is protected by a tube fuse (T 2A / 250 V), which is located on the boiler control board.

For regulating the boiler from a room regulator, only a regulator that has a no-voltage input, i.e. that does not send any external voltage into the boiler, may be used.

Load carrying capacity of the regulator with a relay switch is 24V / 0.1 A.

The room regulator must be connected to the boiler with a two-wire plug. The recommended cross-section for the room regulator connection (copper lead) is 1.5 mm^2.

Leads for connecting the room regulator may not be coaxial with the mains voltage leads.

The terminal for hooking up the room regulator with the relay switch is supplied

by the manufacturer with a connector and is located in the frame of the boiler control panel.

Room regulators may be connected to the PANTHER boiler via eBUS communication. For this type of equipment, however, we recommend installing only Protherm Thermolink B, Thermolink P or Thermolink RC regulators. Only in this way can the manufacturer guarantee the optimal functioning of the boiler.

The room regulator leads are connected to the terminal board of the boiler.

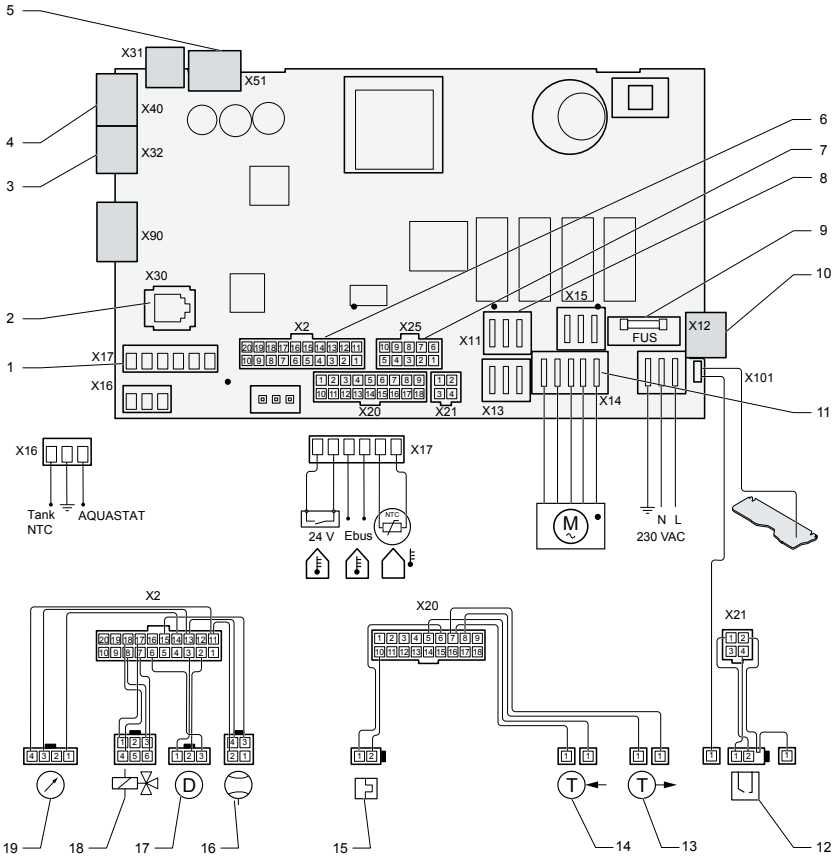
By means of the above-mentioned regulators the isothermal regulation function can be activated. All settings for isothermal curves are carried out with the aid of the room regulator.

Note: To activate the isothermal regulation the external temperature sensor must be installed. The external sensor lead is connected to the terminal board of the boiler.

The external sensor is placed on the coldest wall of the property (most often the northern wall).

Caution: The room regulator lead and the external sensor may not be coaxial with power cables (230 V current etc.).

8.19 Boiler wiring diagram



Legend

1 **Regulation connector**
2 **Exalink connector**
3 **NTC solar connector**
4 **Alternative 24V connection**
5 **User interface**
6 **Hydraulic connector**
7 **Gas valve**
8 **Ventilator**
9 **Fuse**
10 **230 V connection**
11 **Pump**
12 **Electrodes**
13 **NTC CH water intake temperature sensor**
14 **NTC CH return water temperature sensor**
15 **Thermal fuse**
16 **NTC CH flow sensor**
17 **NTC HW flow sensor**
18 **3–way motor valve**
19 **CH pressure sensor**

The connector X16 is used only in the system versions (without DHW heating) of the Panther boilers (KTO and KOO). It is using for DHW sensor connection to external DHW tank.

NEED HELP?

9 Troubleshooting

This section contains all possible error codes together with the appropriate solutions that the USER MAY carry out to restore the boiler to operation — corrective measures. Other error codes MUST be dealt with by a qualified technician.

The external sensor is placed on the coldest wall of the property (most often the northern wall). When displaying an error code a telephone icon and the letter F will flash on the display together with the relevant error code.

During the normal course of operation of the device the ten most recent error alarms can be displayed by simultaneously pressing for seven seconds both keys for setting the CH temperature.

Code	Description
F0	Failure of NTC CH intake water temperature sensor
F1	Failure of NTC CH water return temperature sensor
F2	Failure of NTC HW sensor
F3	Failure of NTC accumulator
F4	Disruption of NTC collector
F5	Failure of air supply sensor
F6	Failure of draw sensor
F7	Disruption of NTC HW return from solar sensor
F8	Failure of NTC accumulator sensor ground
F9	Failure of NTC exhaust hood sensor
F10	Short circuit in NTC CH intake water temperature sensor
F11	Short circuit in NTC CH return water temperature sensor
F12	Short circuit in NTC accumulator sensor ground Short circuit in NTC CH sensor
F13	Short circuit in NTC accumulator sensor
F14	Short circuit in NTC collector sensor
F15	Short circuit in air supply sensor
F16	Short circuit in draw sensor
F17	Short circuit in NTC HW return from solar sensor
F18	Short circuit in NTC accumulator sensor ground
F19	Short circuit in NTC exhaust hood sensor
F20	Safe temperature limiter is active: Cut off due to overheating
F21	Boiler locked out – threshold values exceeded
F22	Low water in boiler – pump locked out
F23	Low water level: high temperature difference between outlet and inlet NTC

Code	Description
F24	Low water level: rapid temperature rise
F25	High flow temperature
F26	Incorrect flow value from stepmotor gas valve
F27	Flame sensing error – ionisation signal contrary to closed gas valve
F28	Failure to light burner at first attempt
F29	Loss of flame during burner operation
F30	Failure of lock-out sensor
F31	Short circuit in lock-out sensor
F32	Anti-freeze protection valve is active: ventilator rotations are outside tolerance limits
F33	Anti-freeze protection valve is active: Pressure sensor is not on Pressure sensor is not off (when the ventilator is not running)
F35	Flue system error
F36	Draft detected (chimney version only)
F37	Ventilator rpms during operation are outside tolerance limits
F38	Measured frequency limit is outside tolerance limits
F39	Error in boiler auto-detection
F41	Incorrect gas regulation
F42	Problem with coding resistor
F43	Incorrect value for boiler variant
F49	Low eBus voltage
F55	Error in CO sensor
F58	No feedback from preheater
F60	Error gas valve +
F61	Error gas valve -
F62	Error – gas valve turned off
F63	EEPROM error
F64	ADC error
F65	High electronics temperature
F66	Error in IIC collectors
F67	Flame signal from ASIC is unreliable Detected flame input signal is outside range (0 or 5V)
F70	Incorrect DSN
F71	Flow sensor permanent failure
F72	Lengthy interval between flow sensor and NTC CH return water sensor
F73	CH pressure sensor not connected or short circuited
F74	CH pressure sensor has electrical fault (or damaged cable)

Code	Description
F75	Permanent failure CH pressure sensor. No rise in pressure detected following pump start
F76	Thermal fuse failure in primary exchanger
F80	Error in SHE entry sensor
F81	Error in charger pump
F82	Error in anode tester
F90	Not connected to APC module
F91	Error in APC module sensor

- When error codes displayed, press RESET key. If following this measure the equipment still does not work, contact a qualified technician.

10 Safety regulations

11 Servicing and maintenance of the boiler

11.1 Cleaning

Turn off the device before cleaning

The boiler cover may be cleaned with a gentle liquid cleaner and damp cloth, then wiped with a dry cloth.

Do not use abrasive cleaners or solvents as these may harm the paintwork.

11.2 Regular servicing

Regular servicing is very important in extending the lifecycle and safe and efficient use of your device.

Incorrect or inappropriate servicing may negatively impact the safe operation of the equipment and may result in injury.

We recommend annual servicing of the equipment.

- Always call in a qualified technician.

11.3 Replacement parts

To ensure safe operation and a lengthy lifecycle for the product, you must use only original parts from the manufacturer.

12 Regulations

In practice there may arise situations in which you must take the following unavoidable measures:

- Protect against (even the accidental) starting up of the boiler during inspection and work on the exhaust gas, gas and water piping by shutting off the electricity supply to the boiler in ways other than by merely turning off the boiler at the main switch (e.g. by pulling the boiler plug from the electrical socket),
- Always shut down the boiler when flammable or explosive vapours are detected (even temporarily) in the areas from which the boiler draws in air for combustion (e.g. from oils for mixing paints, the spreading and spraying of molten materials, gas leaks etc.),

- If water must be discharged from the boiler or from the circuit, it must not be dangerously hot
- If water leaks from the boiler exchanger or if the exchanger fills with ice do not attempt to start the boiler until normal conditions for boiler operation are restored.

13 Converting to different fuel

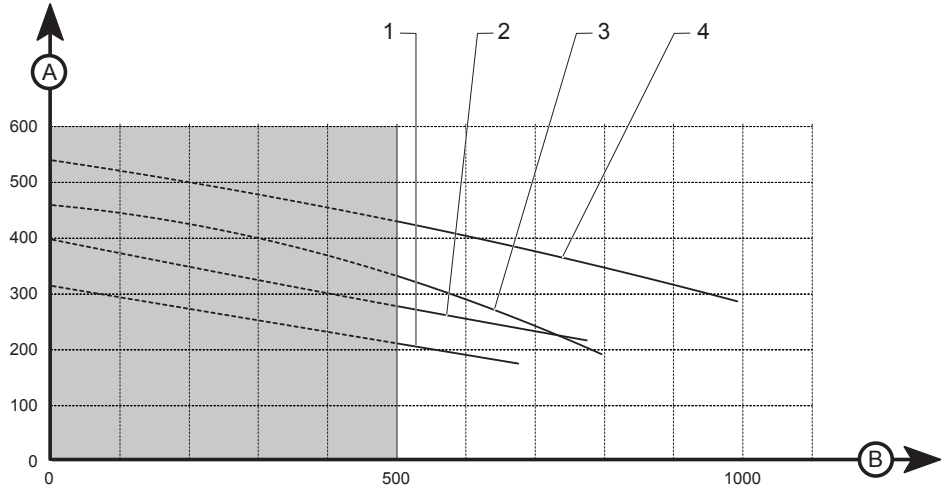
The Panther boilers are in their basic versions designed to use natural gas as fuel. The modifications required to switch to a different fuel must be carried out by an authorised technician with a valid manufacturer's certificate.

For conversion to propane use the conversion kit for switching from natural gas to propane gas. The kit contains all necessary parts and instructions on how to perform the conversion.

14 Contact your sales service centre

If gas leaks, there is a failure in supply or if you suspect the same, shut down the boiler and gas intake and immediately contact the gas company or service centre.

15 Available system pressure



Legend

1 Pump at setting 1, by-pass at factory setting
2 Pump at setting 2, by-pass at factory setting
3 Pump at setting 1, by-pass closed
4 Pump at setting 2, by-pass closed

A Available system pressure (mbar)
B Flow through the heating system (l/h)

16 Technical parameters

Description	Units	PANTHER 30 KTV	
Gas category		II2H3P	
Distribution		C12, C32, C42, C52, C82, B22p	
Ignition		electronic	
Power / fuel		**natural gas**	**propane**
Maximum thermal consumption	kW	32,5	
Minimum thermal consumption	kW	12,2	
Maximum thermal output	kW	29,6	
Minimum thermal output	kW	10,4	
Efficiency	%	91,1	
Maximum gas consumption	m^3/h	3,44	
Minimum gas consumption	m^3/h	1,29	
Maximum gas consumption	kg/h		2,52
Minimum gas consumption	kg/h		0,95
NO_x classification		3	
Gas pressure			
Inlet pressure	mbar	20	37
Membrane diameter	mm	6,90	7,30
Maximum pressure in discharge nozzles	mbar	13,0	35,5
Minimum pressure in discharge nozzles	mbar	1,7	4,8
Discharge nozzle diameter	mm	1,20	0,73
Heating			
Maximum working pressure	bar	3	
Minimum working pressure	bar	0,5	
Recommended operating pressure	bar	1 - 2	
Temperature range	°C	38 - 80	
Expansion tank	l	8	
Maximum pressure in the expansion tank	bar	0,75	
Hot water			
Maximum pressure	bar	10	
Minimum pressure	bar	0,5	
Minimum HW flow	l/min	1,7	

Description	Units	PANTHER 30 KTV
Quantity of HW drawn (at ΔT 30°C)	l/min	14
Temperature range	°C	38 - 60
Electrical data		
Voltage / frequency	V/Hz	230/50
Consumption	W	152
Electrical casings		IPX4
Current	A	0,66
Exhaust venting method		**turbo**
Fume ducting diameter	mm	60 / 100, 80 / 125, 80 / 80
Exhaust gas temperature	°C	147
Quantity of exhaust gas produced	g/s	19,5
Noise	dB	< 50
Dimensions: height / width / depth	mm	807 / 450 / 360
Weight without water	kg	35

Description	Units	PANTHER 25 KOV	
Gas category		II2H3P	
Distribution		B11BS	
Ignition		electronic	
Power/ fuel		**natural gas**	**propane**
Maximum thermal consumption	kW	26,8	
Minimum thermal consumption	kW	9,9	
Maximum thermal output	kW	24,6	
Minimum thermal output	kW	8,4	
Efficiency	%	91,5	
Maximum gas consumption	m^3/h	2,84	
Minimum gas consumption	m^3/h	1,05	
Maximum gas consumption	kg/h		2,08
Minimum gas consumption	kg/h		0,77
NO_x classification		3	
Gas pressure			
Inlet pressure	mbar	20	37
Membrane diameter	mm	6,10	5,20
Maximum pressure in discharge nozzles	mbar	13,0	31,3
Minimum pressure in discharge nozzles	mbar	2,1	4,6
Discharge nozzle diameter	mm	1,20	0,73
Heating			
Maximum working pressure	bar	3	
Minimum working pressure	bar	0,5	
Recommended operating pressure	bar	1 - 2	
Temperature range	°C	38 - 80	
Expansion tank	l	7	
Maximum pressure in the expansion tank	mbar	3	
Hot water			
Maximum pressure	bar	10	
Minimum pressure	bar	0,5	
Minimum HW flow	l/min	1,7	

Description	Units	PANTHER 25 KOV
Quantity of HW drawn (at ΔT 30°C)	l/min	12,01
Temperature range	°C	38 - 60
Electrical data		
Voltage / frequency	V/Hz	230/50
Consumption	W	92
Electrical casings		IPX4
Current	A	0,4
Exhaust venting method		**chimney**
Fume ducting diameter	mm	125
Exhaust gas temperature	°C	108
Quantity of exhaust gas produced	g/s	19,6
Noise	dB	< 50
Dimensions: height / width / depth	mm	740 / 410 / 330
Weight without water	kg	35

Description	Units	PANTHER 25 KOO	
Gas category		II2H3P	
Distribution		B11BS	
Ignition		electronic	
Power/ fuel		**natural gas**	**propane**
Maximum thermal consumption	kW	26,8	
Minimum thermal consumption	kW	9,9	
Maximum thermal output	kW	24,6	
Minimum thermal output	kW	8,4	
Efficiency	%	91,5	
Maximum gas consumption	m^3/h	2,84	
Minimum gas consumption	m^3/h	1,05	
Maximum gas consumption	kg/h		2,08
Minimum gas consumption	kg/h		0,77
NO_x classification		3	
Gas pressure			
Inlet pressure	mbar	20	37
Membrane diameter	mm	6,10	5,20
Maximum pressure in discharge nozzles	mbar	13,0	31,3
Minimum pressure in discharge nozzles	mbar	2,1	4,6
Discharge nozzle diameter	mm	1,20	0,73
Heating			
Maximum working pressure	bar	3	
Minimum working pressure	bar	0,5	
Recommended operating pressure	bar	1 - 2	
Temperature range	°C	38 - 80	
Expansion tank	l	7	
Maximum pressure in the expansion tank	mbar	3	
Hot water			
Maximum pressure	bar	-	
Minimum pressure	bar	-	
Minimum HW flow	l/min	-	

Description	Units	PANTHER 25 KOO
Quantity of HW drawn (at ΔT 30°C)	l/min	-
Temperature range	°C	-
Electrical data		
Voltage / frequency	V/Hz	230/50
Consumption	W	92
Electrical casings		IPX4
Current	A	0,4
Exhaust venting method		**chimney**
Fume ducting diameter	mm	125
Exhaust gas temperature	°C	108
Quantity of exhaust gas produced	g/s	19,6
Noise	dB	< 50
Dimensions: height / width / depth	mm	740 / 410 / 330
Weight without water	kg	35

Description	Units	PANTHER 25 KTV	
Gas category		II2H3P	
Distribution		C12, C32, C42, C52, C82, B22	
Ignition		electronic	
Power/ fuel		**natural gas**	**propane**
Maximum thermal consumption	kW	26,5	
Minimum thermal consumption	kW	10,6	
Maximum thermal output	kW	24,6	
Minimum thermal output	kW	8,9	
Efficiency	%	92,7	
Maximum gas consumption	m^3/h	2,80	
Minimum gas consumption	m^3/h	1,12	
Maximum gas consumption	kg/h		2,05
Minimum gas consumption	kg/h		0,82
NO_x classification		3	
Gas pressure			
Inlet pressure	mbar	20	37
Membrane diameter	mm	5,80	5,95
Maximum pressure in discharge nozzles	mbar	12,4	32,7
Minimum pressure in discharge nozzles	mbar	1,9	5,0
Discharge nozzle diameter	mm	1,20	0,73
Heating			
Maximum working pressure	bar	3	
Minimum working pressure	bar	0,5	
Recommended operating pressure	bar	1 - 2	
Temperature range	°C	38 - 80	
Expansion tank	l	7	
Maximum pressure in the expansion tank	mbar	3	
Hot water			
Maximum pressure	bar	10	
Minimum pressure	bar	0,5	
Minimum HW flow	l/min	1,7	

Description	Units	PANTHER 25 KTV
Quantity of HW drawn (at ΔT 30°C)	l/min	12,01
Temperature range	°C	38 - 60
Electrical data		
Voltage / frequency	V/Hz	230/50
Consumption	W	147
Electrical casings		IPX4
Current	A	0,4
Exhaust venting method		**turbo**
Fume ducting diameter	mm	60 / 100, 80 / 125, 80 / 80
Exhaust gas temperature	°C	122
Quantity of exhaust gas produced	g/s	13,4
Noise	dB	< 50
Dimensions: height / width / depth	mm	740 / 410 / 330
Weight without water	kg	37

Description	Units	PANTHER 25 KTO	
Gas category		II2H3P	
Distribution		C12, C32, C42, C52, C82, B22	
Ignition		electronic	
Power/ fuel		**natural gas**	**propane**
Maximum thermal consumption	kW	26,5	
Minimum thermal consumption	kW	10,6	
Maximum thermal output	kW	24,6	
Minimum thermal output	kW	8,9	
Efficiency	%	92,7	
Maximum gas consumption	m^3/h	2,80	
Minimum gas consumption	m^3/h	1,12	
Maximum gas consumption	kg/h		2,05
Minimum gas consumption	kg/h		0,82
NO_x classification		3	
Gas pressure			
Inlet pressure	mbar	20	37
Membrane diameter	mm	5,80	5,95
Maximum pressure in discharge nozzles	mbar	12,4	32,7
Minimum pressure in discharge nozzles	mbar	1,9	5,0
Discharge nozzle diameter	mm	1,20	0,73
Heating			
Maximum working pressure	bar	3	
Minimum working pressure	bar	0,5	
Recommended operating pressure	bar	1 - 2	
Temperature range	°C	38 - 80	
Expansion tank	l	7	
Maximum pressure in the expansion tank	mbar	3	
Hot water			
Maximum pressure	bar	-	
Minimum pressure	bar	-	
Minimum HW flow	l/min	-	

Description	Units	PANTHER 25 KTO
Quantity of HW drawn (at ΔT 30°C)	l/min	-
Temperature range	°C	-
Electrical data		
Voltage / frequency	V/Hz	230/50
Consumption	W	147
Electrical casings		IPX4
Current	A	0,4
Exhaust venting method		**turbo**
Fume ducting diameter	mm	60 / 100, 80 / 125, 80 / 80
Exhaust gas temperature	°C	122
Quantity of exhaust gas produced	g/s	13,4
Noise	dB	< 50
Dimensions: height / width / depth	mm	740 / 410 / 330
Weight without water	kg	36

Description	Units	PANTHER 12 KOO	
Gas category		II2H3P	
Distribution		B11BS	
Ignition		electronic	
Power/ fuel		**natural gas**	**propane**
Maximum thermal consumption	kW	13,8	
Minimum thermal consumption	kW	4,2	
Maximum thermal output	kW	12,4	
Minimum thermal output	kW	3,4	
Efficiency	%	90,0	
Maximum gas consumption	m^3/h	1,47	
Minimum gas consumption	m^3/h	0,45	
Maximum gas consumption	kg/h		0,91
Minimum gas consumption	kg/h		0,36
NO_x classification		3	
Gas pressure			
Inlet pressure	mbar	20	37
Membrane diameter	mm	4,8	-
Maximum pressure in discharge nozzles	mbar	14,5	36,7
Minimum pressure in discharge nozzles	mbar	1,65	5,8
Discharge nozzle diameter	mm	1,25	0,73
Heating			
Maximum working pressure	bar	3	
Minimum working pressure	bar	0,5	
Recommended operating pressure	bar	1 - 2	
Temperature range	°C	38 - 80	
Expansion tank	l	7	
Maximum pressure in the expansion tank	mbar	3	
Hot water			
Maximum pressure	bar	-	
Minimum pressure	bar	-	
Minimum HW flow	l/min	-	

Description	Units	PANTHER 12 KOO
Quantity of HW drawn (at ΔT 30°C)	l/min	-
Temperature range	°C	-
Electrical data		
Voltage / frequency	V/Hz	230/50
Consumption	W	85
Electrical casings		IPX4
Current	A	0,5
Exhaust venting method		**chimney**
Fume ducting diameter	mm	110
Exhaust gas temperature	°C	96
Quantity of exhaust gas produced	g/s	15,02
Noise	dB	< 50
Dimensions: height / width / depth	mm	740 / 410 / 330
Weight without water	kg	32

Description	Units	PANTHER 12 KTO	
Gas category		II2H3P	
Distribution		C12, C32, C42, C52, C82, B22	
Ignition		electronic	
Power/ fuel		**natural gas**	**propane**
Maximum thermal consumption	kW	13,8	
Minimum thermal consumption	kW	4,4	
Maximum thermal output	kW	12,6	
Minimum thermal output	kW	3,5	
Efficiency	%	91,5	
Maximum gas consumption	m^3/h	1,46	
Minimum gas consumption	m^3/h	0,45	
Maximum gas consumption	kg/h		0,91
Minimum gas consumption	kg/h		0,36
NO_x classification		3	
Gas pressure			
Inlet pressure	mbar	20	37
Membrane diameter	mm	4,8	-
Maximum pressure in discharge nozzles	mbar	14,5	36
Minimum pressure in discharge nozzles	mbar	1,65	6,2
Discharge nozzle diameter	mm	1,25	0,73
Heating			
Maximum working pressure	bar	3	
Minimum working pressure	bar	0,5	
Recommended operating pressure	bar	1 - 2	
Temperature range	°C	38 - 80	
Expansion tank	l	7	
Maximum pressure in the expansion tank	mbar	3	
Hot water			
Maximum pressure	bar	-	
Minimum pressure	bar	-	
Minimum HW flow	l/min	-	

Description	Units	PANTHER 12 KTO
Quantity of HW drawn (at ΔT 30°C)	l/min	-
Temperature range	°C	-
Electrical data		
Voltage / frequency	V/Hz	230/50
Consumption	W	110
Electrical casings		IPX4
Current	A	0,61
Exhaust venting method		**turbo**
Fume ducting diameter	mm	60 / 100, 80 / 125, 80 / 80
Exhaust gas temperature	°C	121,5
Quantity of exhaust gas produced	g/s	10,10
Noise	dB	< 50
Dimensions: height / width / depth	mm	740 / 410 / 330
Weight without water	kg	35,5

Insert the bar code

P2_PANTHER_user manual_devices_EN_(07-11)

www.protherm.eu

Protherm spol. s r.o.
Pplk. Pľjušťa 45
909 01 Skalica
Tel.: 034 6966 101
fax: 034 6966 111